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Palaeontology of the Bagh beds: Part X—Scaphitidae

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ABSTRACT

In an attempt to establish morphologically adjusted relation with rapidly changing environments some of the Bagh ammonoids of Placenticeratid stock have given rise to a variety of heteromorphs, grouped here under a new genus *Placentoscaphites*. This group exhibits tendencies (1) to uncoil, retaining the plano-spiral mode of coiling, and (2) to departing from plano-spiral coiling.

In the light of Kauffman's observations occurrence of these heteromorphs suggests at least three regressive phases in the course of Bagh sedimentation.

1. INTRODUCTION

OCCURRENCE of heteromorphs among Bagh ammonoids was reported by Pal and Chowdhary,[1] and Pal.[2] Detailed account of their work, however, has not yet appeared in print.

The uncoiled forms among our collection of Bagh ammonoids are described here under the new scaphitid genus *Placentoscaphites*, so named because of its apparently being derived from Placenticeratid stock. Present is thus the first ever detailed study of Bagh scaphitids; the result of our study of some other groups of ammonoids has appeared elsewhere (Chiplonkar and Ghare[3,4]).

2, REPOSITORY

The types described here are deposited in the Museum of Geology and Palaeontology of the M.A.C.S. Research Institute, Poona 4.

B3=Feb. 76

LOCALITY INDEX

Bagh	:	20° 21′ 30″: 74° 47′ 00″
Chirakhan	:	22° 22′ 30″: 75° 07′ 00″
Khadlu	:	2° Km North of Mongra 22° 00′ 30″ : 74° 02′ 30″
Mahakal	:	22° 21′ 30″: 74° 50′ 00″
Rampura	:	22° 17′ 30″: 74° 24′ 30″
Sitapuri	:	22° 22′ 30″: 74° 47′ 00″

Etymology

Placentoscaphites dangerfieldi—named after Capt. Dangerfield who first drew attention to presence of fossiliferous rocks in the Narmada valley.

Placentoscaphites carteri—named after Dr. Carter who has made useful contributions to our knowledge of geology of Indian peninsula.

Placentoscaphites keatingei—named after Col. Keatinge who made the first collection of Bagh fossils from Chirakhan.

Placentoscaphites ornatus—name derived from its ornamentation.

Placentoscaphites fourtaui—named after Fourtau who has contributed to Bagh echinology.

Placentoscaphites blanfordi—named after W. T. Blanford a pioneer worker in Geology of the Bagh Beds.

Placentoscaphites helicus—named after helicoid mode of coiling of the species in contrast to its associated species of *Placentoscaphites*.

SYSTEMATIC DESCRIPTION

Superfamily	:	Scaphitaceae Meek 1876
Family	:	Scaphitidae Meek 1876
Subfamily	:	Scaphitinae Meek 1876
Genus	:	*Placentoscaphites* gen. nov.
Geno-type	:	*Placentoscaphites dangerfieldi* sp. nov. (*vide infra*).

DIAGNOSIS: Shell moderately large with oval umbilicus; whorls more or less compressed to convex and tumid; ornamentation of simple low ribs, with or without weak umbilical tubercles and ventral clavii; ventrolateral tubercles if present may tend to be clavate. Suture placenticeratid but distorted.

AGE: Cenomanian-Turonian.

REMARKS: The polyphyletic origin of uncoiled ammonoids has been realised since long by workers like Smith,[5,6] Nowak,[7] Spath,[8] Reeside,[9] etc. and Nowak has remarked that "whether scaphitid forms do not occur in other families and genera may be established by future workers". The provincial development of these in independent areas is considered by Cobban[10] and Matsumoto[11] as particularly apparent from Turonian onwards.

The generic nomenclature such as *Holcoscaphites* Nowak, *Acanthoscaphites* Nowak, *Haploscaphites* Nowak and *Desmoscaphites* Reeside, which is already currently used, indicate the close affinities of these heteromorphs to the genera from which they are considered to have been derived.

Association of these heteromorphs with abundantly represented Placenticeratids coupled with their placenticeratid sutural pattern indicates that these Bagh heteromorphs have placenticeratid affinities. They are placed here, like other heteromorphs, under the admittedly polyphyletic family Scaphitidae, and their apparently having been derived from placenticeratid stock has led us to name this genus *Placentoscaphites*.

Placentoscaphites dangerfieldi sp. nov.

(Pl. I, figure 2)

MATERIAL: Two specimens, *Holotype* M.A.C.S. No. G 424.

DIMENSIONS: Specimen No. MACS G 424

Longer diameter of shell	..	13·30 cm
Shorter diameter of shell	..	8·84 cm
Longer diameter of umbilicus	..	3·40 cm
Shorter diameter of umbilicus	..	2·50 cm

DESCRIPTION: It is an elliptical shell with oval umbilicus and flat venter. The sides are flat or slightly convex and sloping. It bears paired ribs starting from the umbilical tubercles and ending at the ventrolateral clavii; the venter is flanked by clavii smaller than the ventrolateral clavii.

As can be made out, the suture shows first lateral saddle bifid, into two unequal parts. First lateral lobe is narrow, very deep with moderate frilling. The umbilical saddle shows three adventitious saddles of which the outer one is broadest.

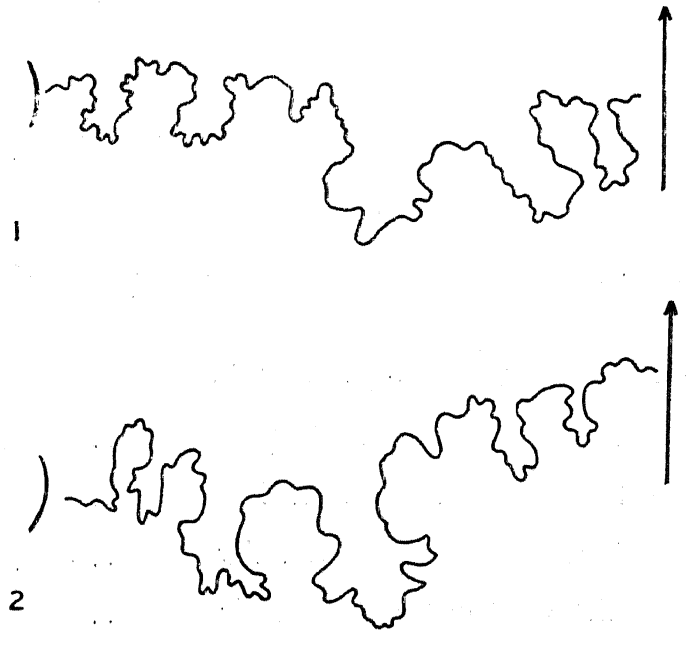
REMARKS: The type differs from *Placentoscaphites keatingei* sp. nov. (*vide infra*) in having a more elliptical outline, a simpler suture and slightly more convex sides. It differs from *Placentoscaphites carteri* sp. nov. (*vide infra*), *Placentoscaphites ornatus* sp. nov. (*vide infra*), *Placentoscaphites blanfordi* sp. nov. (*vide infra*) and *Placentoscaphites fourtaui* sp. nov. (*vide infra*) in being compressed.

OCCURRENCE: Purple shales between Nimar Sandstone and Nodular Limestone at Mahakal.

Placentoscaphites carteri sp. nov.

(Pl. II, figure. 1, Text figure 1)

MATERIAL: One specimen, *Holotype* M.A.C.S. No. G 423.



TEXT-FIGURES 1 and 2

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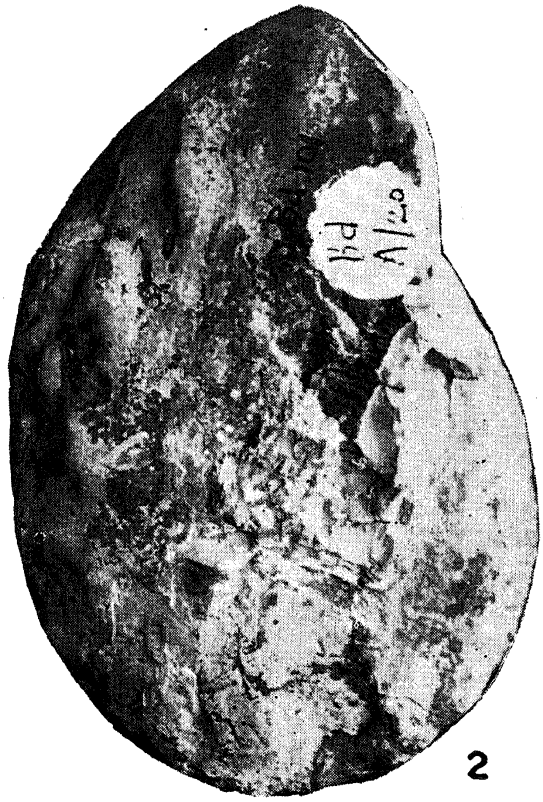
1



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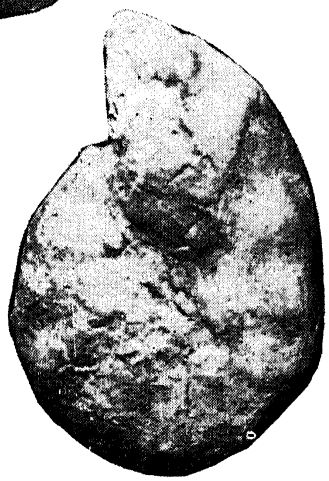

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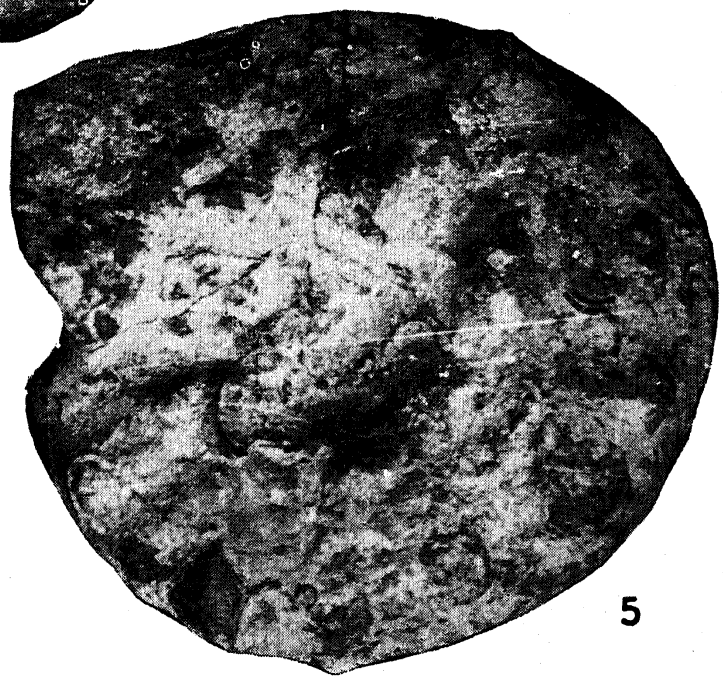

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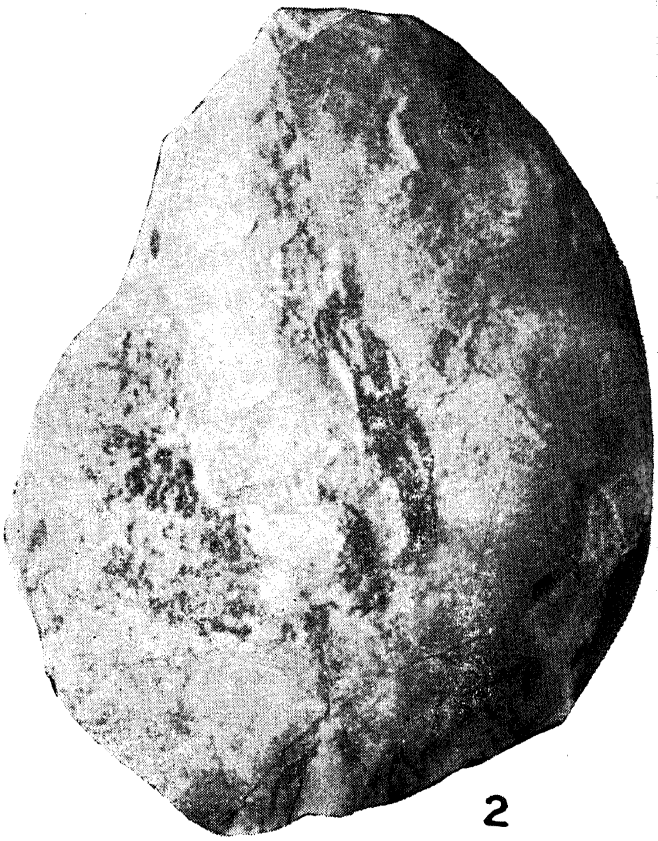
1



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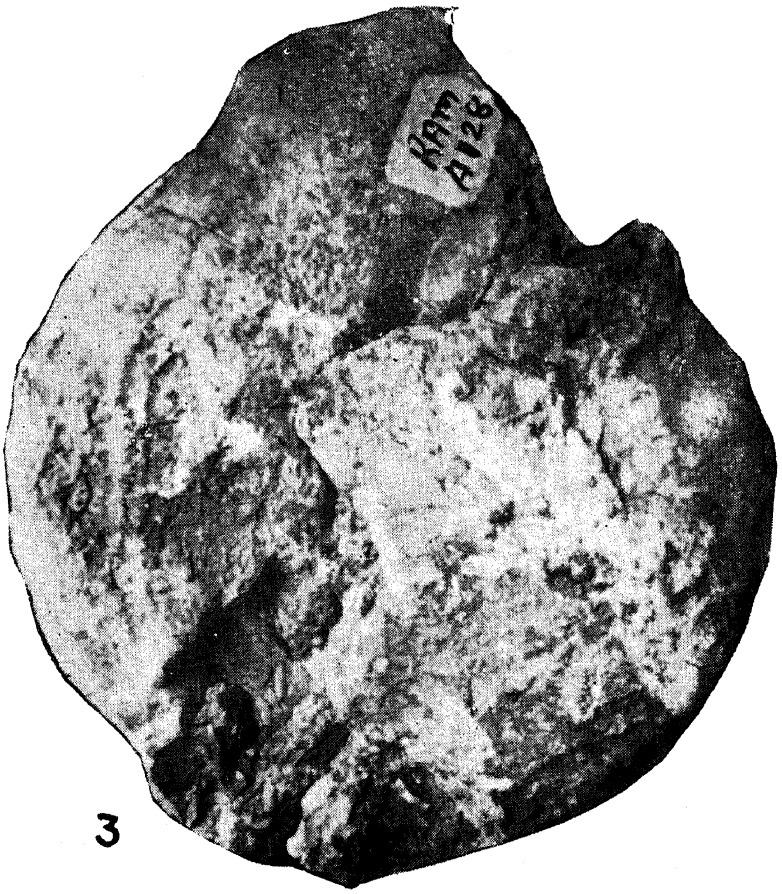

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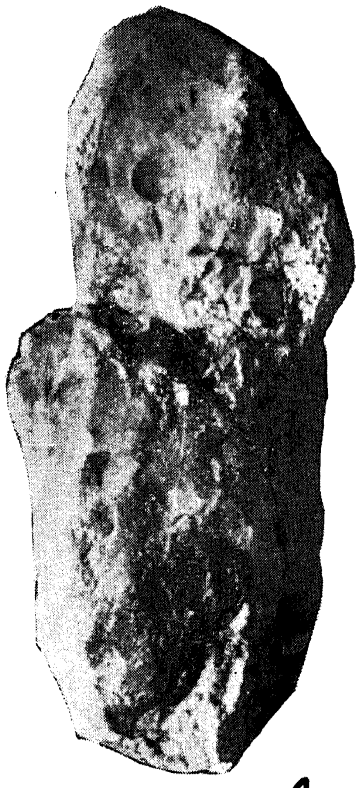

4

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DIMENSIONS:

Longer diameter of shell	..	10·5 cm
Shorter diameter of shell	..	9·7 cm
Longer diameter of umbilicus	..	3·0 cm
Shorter diameter of umbilicus	..	2·1 cm

DESCRIPTION: It is an uncoiling form with venter rounded and umbilicus oval; sides very tumid which on earlier whorls are rather flat. The whorl section at adult stage is more wide than high. As ornamentation it has weak pointed umbilical tubercles and clavii bordering the venter; the sides bear ribs that are low and broad.

The suture though ill-preserved shows club-shaped first lateral saddle and shallow broad first lateral lobe with an auxillary saddle. There are three to four small adventitious saddles in the umbilical saddle, tne outer one being more developed.

REMARKS: The present species differs from *Placentoscaphites ornatus* sp. nov. (*vide infra*), *Placentoscaphites blanfordi* sp. nov. (*vide infra*) and *Placentoscaphites fourtaui* sp. nov. (*vide infra*) in having less pronounced ornament, and from *Placentoscaphites dangerfieldi* sp. nov. (*vide supra*) and *Placentoscaphites keatingei* sp. nov. (*vide infra*) in being tumid.

OCCURRENCE: Nodular Limestone at top of Bagh Caves.

Placentoscaphites keatingei sp. nov.

(Pl. II, figure 2, Text-figure 2)

MATERIAL: One specimen, *Holotype*, M.A.C.S. No. G 425

DIMENSIONS:

Longer diameter of shell	..	13·00 cm
Shorter diameter of shell	..	9·90 cm
Longer diameter of umbilicus	..	3·85 cm
Shorter diameter of umbilicus	..	2·87 cm

DESCRIPTION: The species has elliptical outline with narrow flat venter. The early whorls have feeble umbilical tubercles; the ventrolateral tubercles become bullate in later stages of growth. Tendency to uncoil becomes visible in the last whorl. The suture is like that of the genus *Proplacenticeras* but distorted.

REMARKS: The present species can well be differentiated from *Placentoscaphites dangerfieldi* sp. nov. (*vide supra*) by its flat and narrow venter, bullate ventrolateral tubercles and suture more frilled. It differs from *Placentoscaphites carteri*, *Placentoscaphites ornatus* and *Placentoscaphites blanfordi* in being compressed.

OCCURRENCE: Nodular Limestone at Rampura.

Placentoscaphites ornatus sp. nov.

(Pl. I, figure 5)

MATERIAL: One specimen, *Holotype*, M.A.C.S. No. G 426.

DIMENSIONS:

Longer diameter of shell	..	11·4 cm
Shorter diameter of shell	..	10·4 cm
Longer diameter of umbilicus	..	3·1 cm
Shorter diameter of umbilicus	..	2·5 cm

DESCRIPTION: The species is uncoiling with elliptical outline having oblong umbilicus and broad rounded venter. The sides are very tumid giving more width than height to body chamber. Ornamentation consists of strong umbilical tubercles, broad and strong ventrolateral tubercles and feeble ventral clavii. Each of the paired ribs starting from umbilical tubercles ends in a ventrolateral tubercles, the anterior ribs being longer. Suture is not preserved.

REMARKS: This type differs from *Placentoscaphites carteri* in ornament; from *Placentoscaphites keatingei* and *Placentoscaphites dangerfieldi* in being tumid and from *Placentoscaphites blanfordi* and *Placentoscaphites fourtaui* in being more elliptical and in having whorl section that has less height than width.

OCCURRENCE: Deola-Chirakhan Marl at Chirakhan.

Placentoscaphites fourtaui sp. nov.

(Pl. I, figure 1)

MATERIAL: One specimen, *Holotype*, M.A.C.S. No. G 428.

DIMENSIONS:

Longer diameter of shell	..	10·74 cm
Shorter diameter of shell	..	8·40 cm.

DESCRIPTION: The shell is uncoiling but departs only slightly from a circular outline and thus has a sub-circular umbilicus. Venter is narrow and sides flat and sloping on earlier whorls, but become somewhat convex, the venter also becoming broadly rounded on last whorl.

Ornamentation consists of strong umbilical and ventrolateral tubercles and ventral clavii. Ribbing tends to be more and more prorsiradiate with growth of shell. Shell is somewhat damaged in later growth stages, but shows a distinct depression, perhaps a construction of whorl, at the beginning of the last whorl. The last two ventral clavii become tuberculate and are present only on one side of the shell. Suture is not preserved.

REMARKS. The present species differs from *Placentoscaphites dangerfieldi* and *Placentoscaphites keatingei* in being tumid. *Placentoscaphites carteri* and *Placentoscaphites ornatus* differ from the present species in having more elliptical outline and whorl section with more width than height. *Placentoscaphites blanfordi* also differs from the present species in being more elliptical and in having ventrolateral bullate tubercles.

OCCURRENCE: Nodular Limestone at the top of Bagh Caves.

Placentoscaphites blanfordi sp. nov.

(Pl. I, figure 3)

MATERIAL: One specimen, *Holotype*, M.A.C.S. No. G 427.

DIMENSIONS:

Longer diameter of shell	..	8·26 cm
Shorter diameter of shell	..	5·70 cm
Longer diameter of umbilicus	..	2·25 cm
Shorter diameter of umbilicus	..	1·50 cm.

DESCRIPTION: The shell is elliptical with oval umbilicus and convex sides, bearing umbilical and ventrolateral bullate tubercles and ventral clavii. The ventrolateral tubercles become distinctly elongate and are arranged as three parallel bullae of unequal lengths on last whorl. Suture is not preserved.

REMARKS: This species differs from *Placentoscaphites dangerfieldi* and *Placentoscaphites keatingei* in being tumid at all stages; from *Placentoscaphites carteri*, *Placentoscaphites ornatus* and *Placentoscaphites fourtaui* in having ventrolateral tubercles distinctly bullate.

OCCURRENCE: Deola-Chirakhan Marl at Sitapuri.

Placentoscaphites helicus sp. nov.

(Pl. II, figures 3 and 4)

MATERIAL: Two specimens, *Holotype*, M.A.C.S. No. G. 429.

DESCRIPTION: This species has narrow flat venter with flat sloping sides. It bears umbilical and ventrolateral tubercles and ventral clavii. The planospiral coiling changes to helical coiling in later stages and in the cross section the last planospiral whorl is nearly touching one side of the body whorl. Thus the median line of the body whorl and that of the next inner whorl are at an acute angle.

REMARKS: Departure from planospiral coiling into helical manner of coiling distinguishes this species from all the other species described here under this genus.

OCCURRENCE: Nodular Limestone at Rampura and Khadlu.

DISCUSSION

Being new to science the genus *Placentoscaphites* and its species by themselves provide little of evidence for drawing any conclusion regarding their age and affinities. But they represent the efforts of the placenticeratids of Narmada Valley basin, to survive against the rapidly changing condîtions (Chiplonkar and Badve[13]) by developing the heteromorphs.

Kauffman[14] studied the relation between radiation and extinction with transgression and regression respectively, with the help of groups like *Scaphites* and Inoceramids, and concluded that an irregular but simpler pattern of evolution coupled with accelerated rate of speciation during regression with its peak regression is observed.

Thus heteromorphs are structural modifications as attempts at survival under rapidly changing conditions, and appear to be associated with regressive pulse.

The present Bagh Scaphitids come from the purple shales at the top of Nimar Sandstone and the top of Nodular Limestone in Bagh-Rampura-Mahakal region, and the top of Deola-Chirakhan Marl in the Deola-Chirakhan-region. Thus on the basis of occurrence of these heteromorphs at least three regressive phases in the Bagh sedimentation can be considered as (1) at the end of the deposition of the shaly horizon near the top of Nimar Sandstone, (2) towards the close of the deposition of the Nodular Limestone and (3) after the deposition of the Deola-Chirakhan Marl.

ACKNOWLEDGEMENTS

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EXPLANATION OF PLATES

Plate I

Figure 1. *Placentoscaphites fourtaui* sp. nov. Side view, × 0·76. *Holotype*, MACS No. G 428.

Figure 2. *Placentoscaphites dangerfieldi* gen. et sp. nov. Side view, × 0·76. *Holotype*, MACS No. G 424.

Figure 3. *Placentoscaphites blanfordi* sp. nov. Side view, × 0·76. *Holotype*, MACS No. G 427.

Figure 4. *Placentoscaphites fourtaui* sp. nov. Apertural view. × 0·76 *Holotype*, MACS No. G 428.

Figure 5. *Placentoscaphites ornatus* sp. nov. Side view, × 0·76. *Holotype*, MACS No. G 426

Plate II

Figure 1. *Placentoscaphites carteri* sp. nov. Side view, × 0·66. *Holotype*, MACS No. G 423.

Figure 2. *Placentoscaphites keatingei* sp. nov. Side view, × 0·66. *Holotype*, MACS No. G 425.

Figure 3. *Placentoscaphites helicus* sp. nov. Side view. × 0·66. *Holotype*, MACS No. 429.

Figure 4. *Placentoscaphites helicus* sp. nov. Apertural view of same specimen, × 0·66.